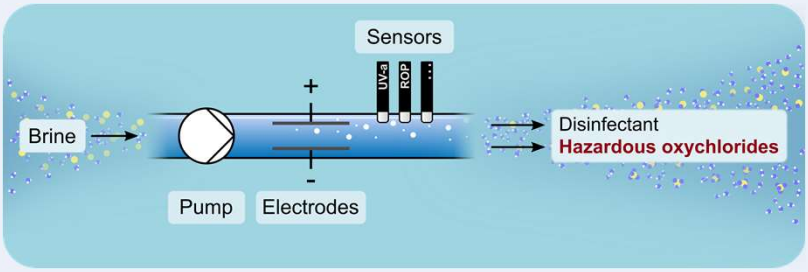
Real-Time Impedance Spectroscopy of the Electrochlorination Process

Edwin.Ross@wetsus.nl

Prospective start: Fall 2021
Duration: 4 – 6 months
Location: Wetsus Research Institute, Leeuwarden, the Netherlands

Project description

Electrochlorination is an increasingly important means of disinfecting water. In this process, salty water is electrolized to produce hypochlorite, an effective disinfectant. However, some byproducts, specifically chlorate and perchlorate, have been found to be detrimental to human and animal health and need to be monitored.



Impedance measurements could yield valuable information about the reactions taking place at the electrodes which, when combined with a model, could form a robust monitoring solution.

Challenge

It will be your task to investigate what we can learn from impedance data for this application, and to try to follow an electrochlorination process under different operational conditions. The results will help to build a so-called software sensor: A virtual sensor that fuses the information provided by a set of sensors to obtain an estimate of the chlorate and perchlorate activities in real-time. Your tasks will include:

- Recording impedance measurements, with stock solutions and with electrochlorination experiments
- Think creatively about how we can use impedance data to help with the monitoring of byproduct formation
- Performing the measurements under differing conditions, to learn the limits of this method

Your profile

- Highly motivated to learn about the assessment of electrochemical processes and impedance spectroscopy
- Currently enrolled in bachelor's or master's study in chemical science or related field
- Experienced with laboratory work, preferably including impedance spectroscopy
- Proficient in written and spoken English
- EU citizen or non-EU citizen already enrolled in a Dutch university and living in the Netherlands

Benefits

- Gain hands-on experience with electrochemical impedance spectroscopy in a practical application
- Deepen your understanding of electrochemistry
- Contribute to reducing health risks related to the disinfection of water
- Work in an advanced laboratory with colleagues from around the world
- If you don't have an Erasmus grant, you will receive a €175 monthly allowance

How to apply

Interested? Send an email to edwin.ross@wetsus.nl to get in touch. Please supply an up-to-date CV and a short letter explaining your interest in this specific project.